Name Key

Practice with square roots and radicals.

Find the square root.

1. $\sqrt{121}$ — 11

2. $\sqrt{1600x^2}$ — 40x

3. $\sqrt{\frac{1}{289}}$ — $\frac{1}{17}$

4. $\sqrt{13^2}$ — 13

Estimate the value of the square root. Do not use a calculator.

5. $\sqrt{15}$ — ~3.9

6. $\sqrt{59}$ — ~7.7

7. $\sqrt{149}$ — ~12.2

Simplify the following square roots.

8. $\sqrt{150y^7}$ — $\sqrt{6}\sqrt{25}\sqrt{y^6}\sqrt{y}$ — $5y^3\sqrt{6y}$

9. $3\sqrt{20y^4z^5}$ — $3\sqrt{4}\sqrt{5}\sqrt{y^4}\sqrt{z^4}\sqrt{z}$ — $6y^2z^2\sqrt{5z}$

10. $6\sqrt{49a^6}$ — $6\cdot 7a^3$ — $42a^3$

11. $5\sqrt{8x^9y^3}$ — $5\sqrt{4}\sqrt{2}\sqrt{x^8}\sqrt{x}\sqrt{y^2}\sqrt{y}$ — $10x^4y\sqrt{2xy}$

Multiply. Reduce all radicals.

12. $4\sqrt{8}\cdot 3\sqrt{10}$ — $12\sqrt{4}\sqrt{2}\sqrt{2}\sqrt{5}$ — $48\sqrt{5}$

14. $3\sqrt{54}\cdot\sqrt{18}$ — $3\sqrt{6}\sqrt{9}\sqrt{6}\sqrt{3}$ — $54\sqrt{3}$

15. $8\sqrt{6a^3}\sqrt{6a^3}$ — $8\cdot 6a^3$ — $48a^3$

16. $(2\sqrt{3}-5\sqrt{7})^2$ — $(2\sqrt{3}-5\sqrt{7})(2\sqrt{3}-5\sqrt{7})$ — $4\cdot 3-10\sqrt{21}-10\sqrt{21}+25\cdot 7$ — $187-20\sqrt{21}$

Divide and simplify. Remember to rationalize the denominator.

17. $\sqrt{\frac{4}{5}}\frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

18. $2\sqrt{\frac{20}{3}}\frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{60}}{3}$ — $\frac{4\sqrt{15}}{3}$

19. $\sqrt{\frac{30x^4}{28x}}\sqrt{\frac{15x^3\sqrt{14}}{\sqrt{14}\sqrt{14}}}$ — $\frac{x\sqrt{210x}}{14}$

20. $\frac{\sqrt{25y^5}}{\sqrt{15y^2}} = \frac{5y^3\sqrt{3}}{\sqrt{3}\sqrt{3}}$ — $\frac{y\sqrt{15y}}{3}$

Add and subtract. Simplify all radicals.

21. $\sqrt{18}-\sqrt{2}-\sqrt{8}$ — $3\sqrt{2}-\sqrt{2}-2\sqrt{2}$ — 0

22. $5\sqrt{48}-\sqrt{75}+2\sqrt{12}$ — $5\sqrt{3}\sqrt{16}-\sqrt{3}\sqrt{25}+2\sqrt{3}\sqrt{4}$ — $20\sqrt{3}-5\sqrt{3}+4\sqrt{3}$ — $19\sqrt{3}$

23. $5\sqrt{3}+2\sqrt{27}-\sqrt{72}$ — $5\sqrt{3}+2\sqrt{9}\sqrt{3}-\sqrt{36}\sqrt{2}$ — $5\sqrt{3}+6\sqrt{3}-6\sqrt{2}$ — $11\sqrt{3}-6\sqrt{2}$

Simplify.

24. $\frac{3}{(5-2\sqrt{7})}\frac{(5+2\sqrt{7})}{(5+2\sqrt{7})}$ — $\frac{15+6\sqrt{7}}{25-4\cdot 7} = \frac{15+6\sqrt{7}}{-3}$ — $-5-2\sqrt{7}$

25. $\frac{(4+2\sqrt{2})(2\sqrt{5}+3)}{(2\sqrt{5}-3)(2\sqrt{5}+3)} = \frac{8\sqrt{5}+4\sqrt{10}+12+6\sqrt{2}}{4\cdot 5-9}$ — $\frac{8\sqrt{5}+4\sqrt{10}+6\sqrt{2}+12}{11}$